
PRESTO Update – NE DOLWG Aug 16

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Background

- NASA's Space Launch System (SLS) is using vertically complete atmospheric measurements in vehicle design analyses and day-of-launch (DOL) operations support
 - Designing the vehicle using wind energy spectral content not dependent on instrumentation source
 - Using measured winds as input for DOL vehicle trajectory and loads assessments
 - Allows for multiple data sources to be used in DOL assessments
- The United States Air Force Eastern Range (ER) at Cape Canaveral Air Force Station provides atmospheric data through network of weather balloons and Doppler Radar Wind Profiler (DRWP) instruments.
 - Automated Meteorological Profiling Systems (AMPS)
 - Low Resolution Flight Element (LRFE)
 - High Resolution Flight Element (HRFE)
 - Jimsphere
 - Tropospheric DRWP – NASA owned
 - 915 MHz DRWP
- MSFC Natural Environments (NE) branch is developing software (Profile Envision and Splice Tool (PRESTO)) to produce vertically complete profiles from available sources

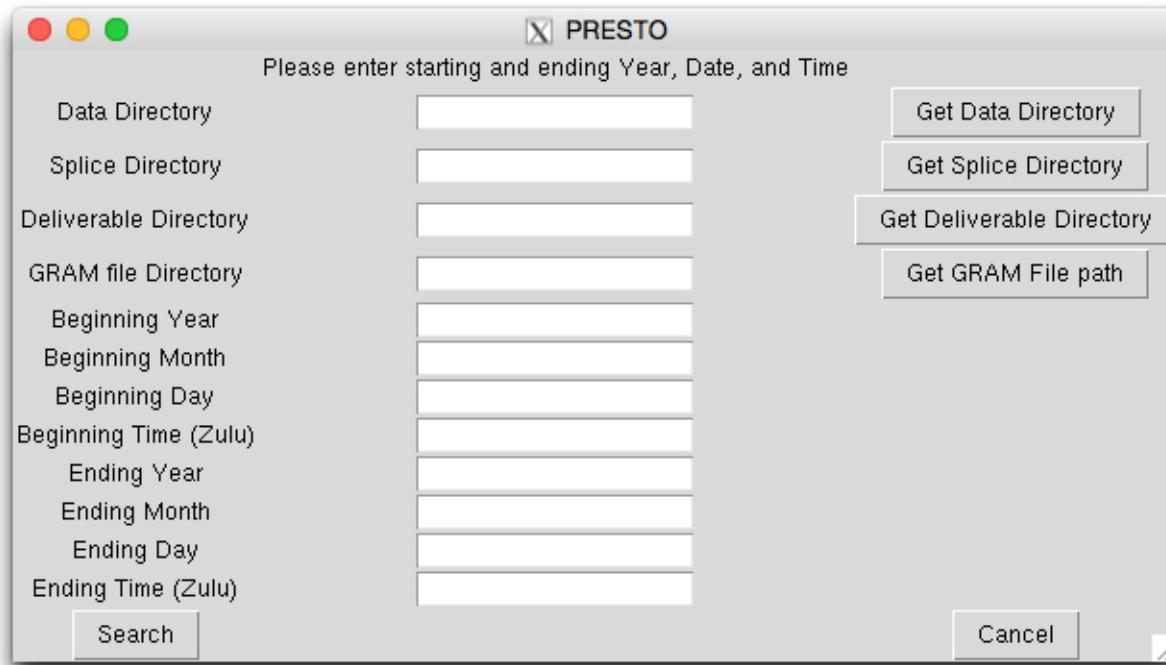
Project Progress

- PRESTO development requires compliance with NASA Software Engineering Requirements (NPR 7150.2B) standard
 - Project documentation
 - Approved
 - Software Development Plan
 - Software Requirements Specification (SRS)
 - Software Design Document
 - Software Test Plan
 - Planned
 - Software Version Description
 - Software User Manual
 - Software Maintenance Plan
 - Technical reviews
 - Software Design Review – 5/16
 - Test Readiness Review – 10/16
 - Acceptance Review – 5/17
 - Test cycles
 - Unit Testing – currently underway
 - Acceptance Testing – 11/16
 - SLS Operations Center Integration Testing – 1/17
 - End-to-End Testing – 4/17
 - Anticipated completion date – May 2017
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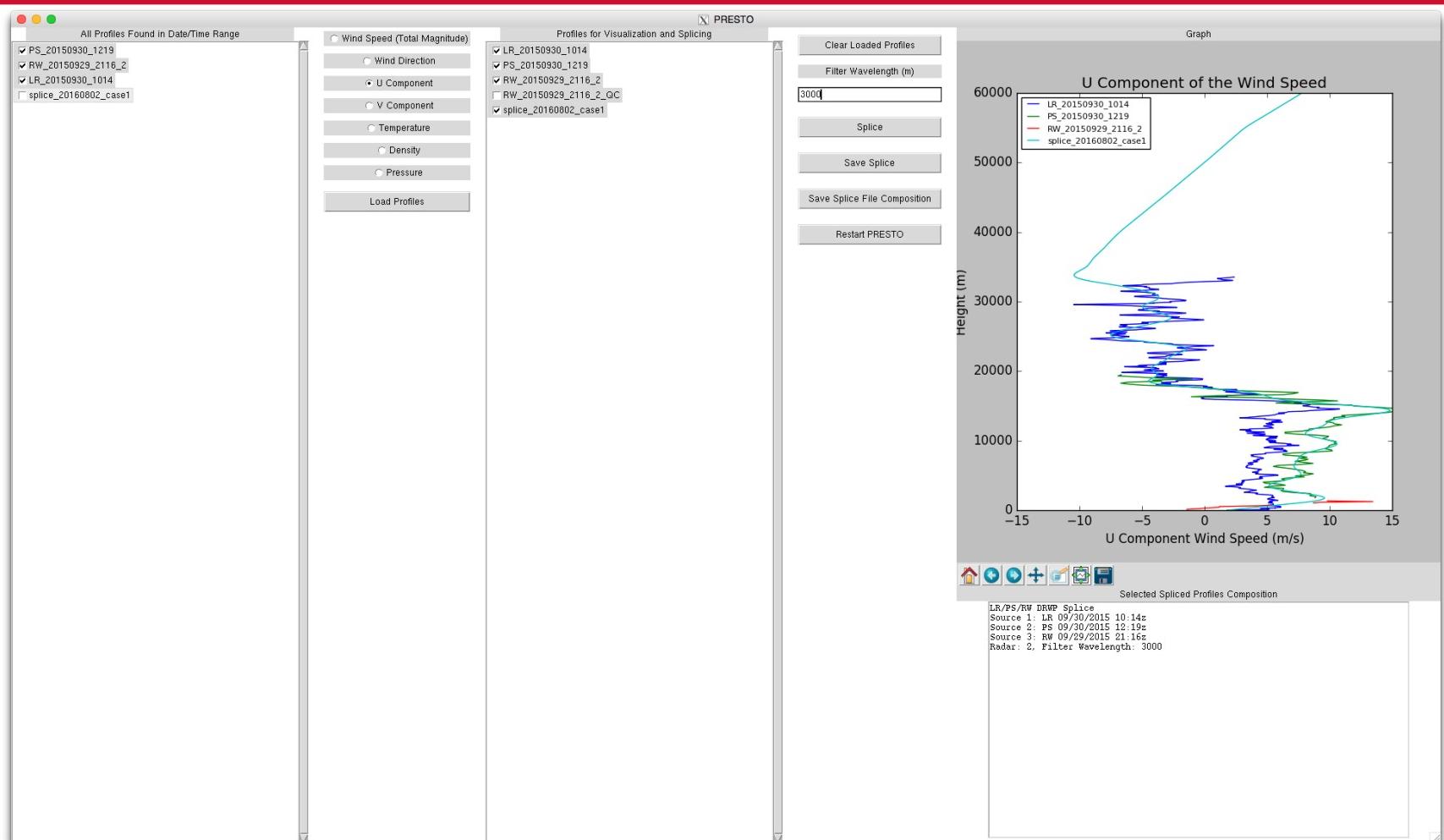
Software Verification & Validation

- Verification will show PRESTO compliance to the software requirements defined in SRS
 - Accomplished through test cases mapped against a verification compliance matrix to ensure complete test coverage
 - Unit testing to check for completeness
 - Acceptance testing “official set” of tests
- Validation will assess the spliced and filtered wind data output produced from PRESTO against output from another source code
 - NE has separate source code with the same algorithms used to generate DRWP spliced databases for SLS vehicle design analyses

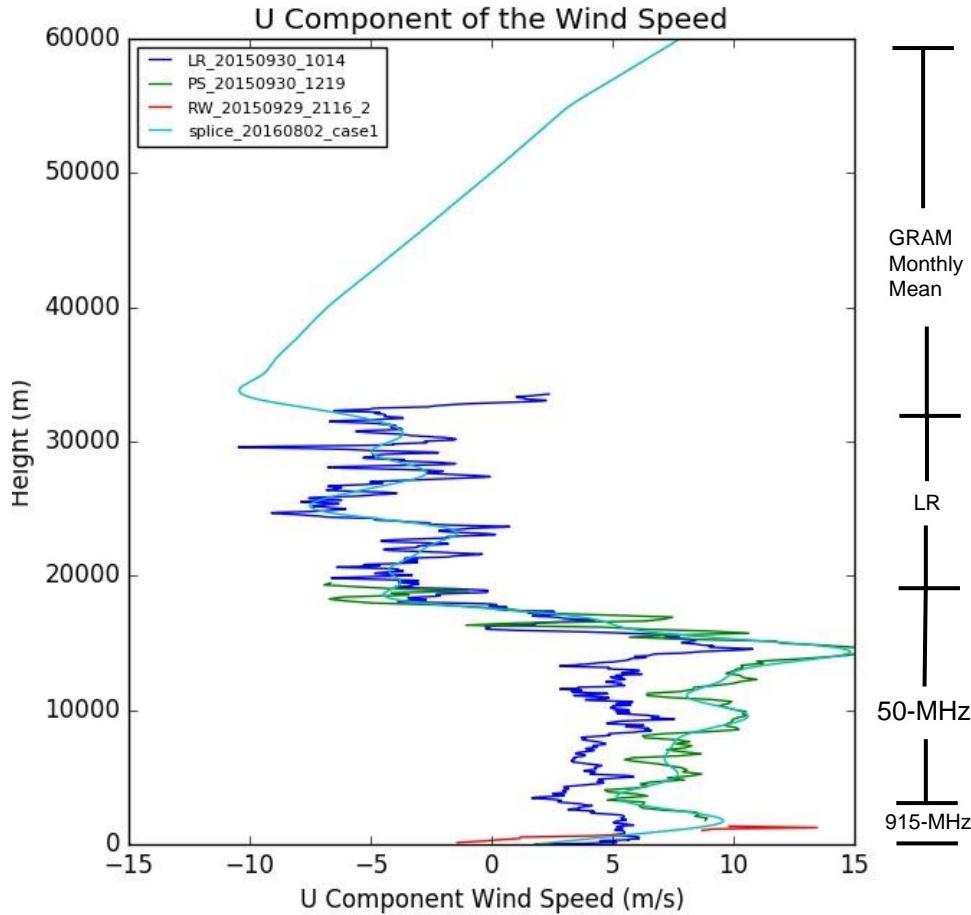
PRESTO Input



PRESTO Main



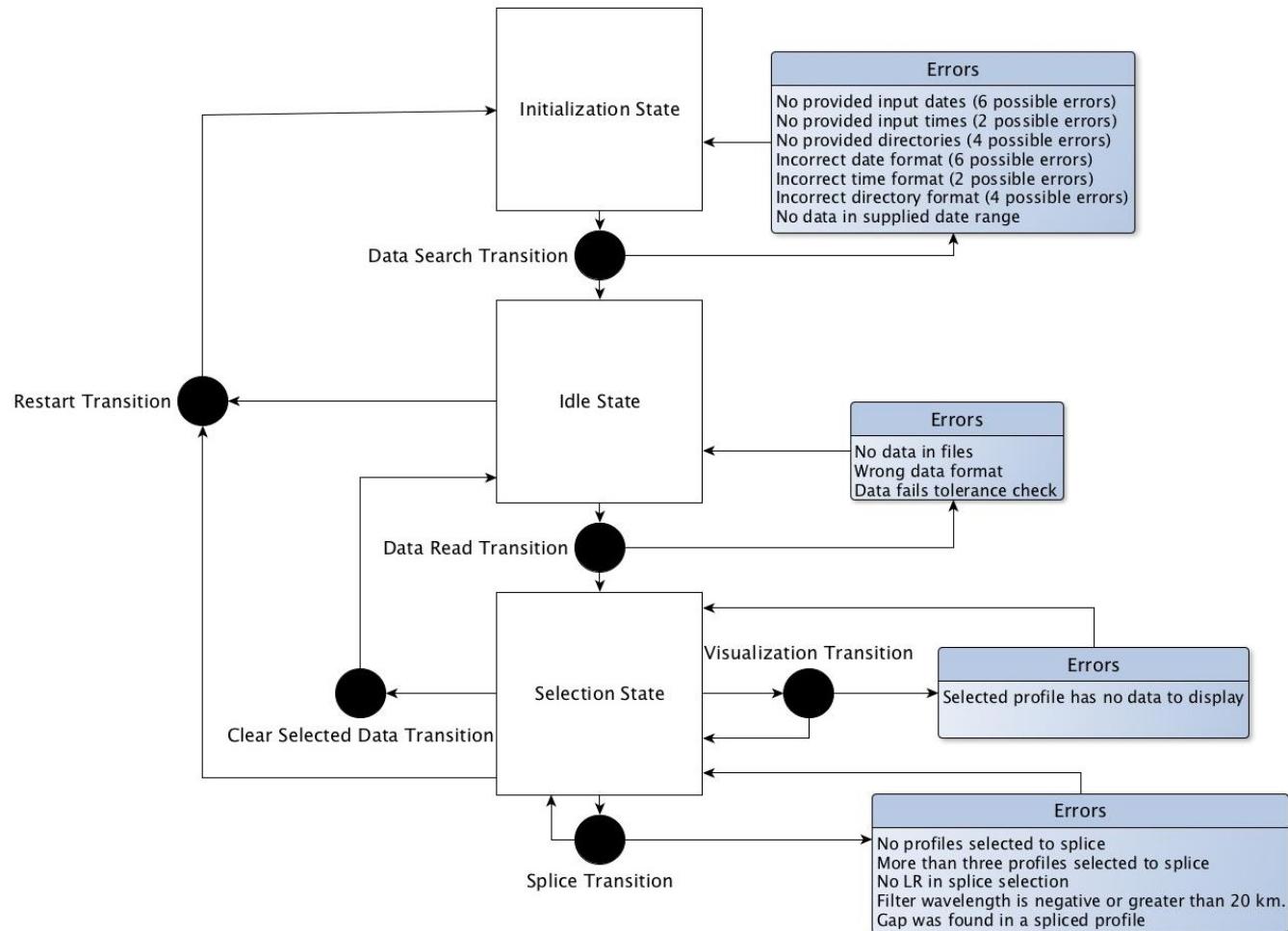
PRESTO Input/Output Example



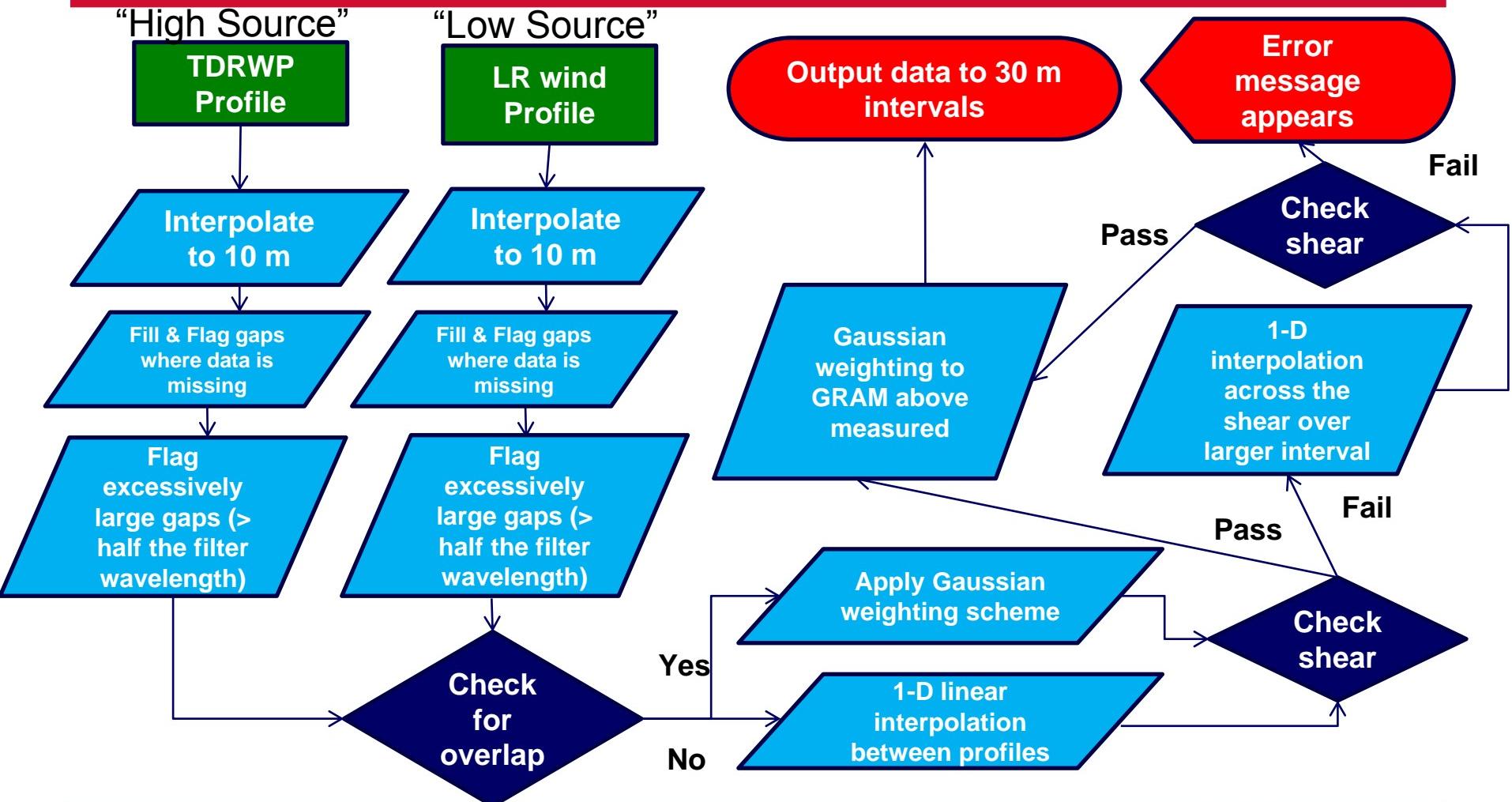
- Spliced Profile Sources:
- KSC Range Reference Atmosphere Monthly Mean Data output from Earth Global Reference Atmosphere Model (GRAM)
 - Automated Meteorological Profiling System (AMPS) Low-Resolution (LR) Balloon
 - 50-Mhz Doppler Radar Wind Profiler (DRWP)
 - 915-Mhz DRWP

BACKUP

PRESTO State Diagram



PRESTO Splicing Flowchart



Modified from Barbré, Jr., R. E., "Characteristics of the Spliced KSC Doppler Radar Wind Profiler Database". Presentation to the Natural Environments Day-of-Launch Working Group, 14 August 2013.